Taylor 1993). At the same time, young-of-year recruitment for other finfish species exhibited no real patterns during the 1980s (Henry and Manooch 1993). The 1988 and 1989 striped bass year classes are now protected by a myriad of regulations and subject to commercial and recreational harvest quotas until the striped bass decline is stabilized (Henry 1993).

In spite of the seemingly strong year classes of striped bass in 1988 and 1989, there remains an abnormally high level of early life stage mortality, particularly after eggs hatch and before recruitment of young-of-the-year is completed on the nursery grounds of western Albemarle Sound (Rulifson et al. 1993). Starvation has been hypothesized as one of the principal causes of larval Roanoke striped bass mortality (Rulifson 1984a; Rulifson and Stanley 1985; Rulifson et al. 1986a, 1986b), and was hypothesized as one of the contributors to poor year classes of Potomac striped bass between 1974 and 1977 (Martin and Malloy 1981). Striped bass larvae appear to be food limited in the Roanoke River system in years of high flow and extremely low flow (Rulifson et al. 1986a). High river flow, caused by freshwater discharge from Roanoke Rapids Lake, sweeps striped bass eggs and yolk-sac larvae into areas of extremely poor zooplankton productivity in western Albemarle Sound (Rulifson and Stanley 1985). Low flow conditions allow greater zooplankton productivity in the lower Roanoke River, but not in concentrations great enough for the larvae to feed successfully (Rulifson et al. 1986a). Poor water quality or the presence of pollutants, possibly causing aberrant feeding behavior of the larvae and resulting in starvation, also has been hypothesized (Rulifson 1984a).

Zooplankton surveys conducted in western Albemarle Sound in 1982 and 1983 (Rulifson 1984a), and in the lower portions of the Roanoke watershed from 1984 through 1991 (Rulifson et al. 1992a, 1992b), indicated zooplankton densities of one to two orders of magnitude less than other estuarine waters containing striped bass stocks (e.g., Potomac River Estuary; Sacramento-San Joaquin Estuary). These data suggest that poor survival of striped bass postlarvae and smallest juveniles may be caused in part by an inadequate food supply.

Inadequate food supply is not simply a function of numbers of prey items, but also the quality of the prey. Zooplankton must be of the right size and speed to be caught and ingested by larval fish. In other words, prey supply is the combination of prey abundance and prey accessibility (Ney 1990, Brandt et al. 1992). Local density-dependent (biological) and density-independent (physical) processes on a small scale can greatly affect trophic interactions, mortality, and eventually production at the system level (Kareiva and Andersen 1988, Possingham and Roughgarden 1990, Brandt et al. 1992).

If striped bass are food limited in this system, then examination of early life stages of other co-habiting finfish species should indicate whether the limitation is quantity, quality, or both. Those species that have diet overlap with striped bass may show greater success at feeding on preferred prey of striped bass, suggesting that striped bass are being outcompeted for food resources. On the other hand, those same finfish species may show a poor feeding rate, similar to striped bass, suggesting that young finfish in this system are food limited by quantity.